REMARKS

I. Status of Claims

Claims 1 - 18, 27 - 32, and 34 - 37 are pending. Claims 19 - 26 and 33 have been cancelled. Favorable consideration of the remaining claims is respectfully requested in light of the following remarks.

II. Claims 1, 3 - 6, 8, 12 - 13, 15 - 17 and 27 - 32 are patentable under 35 U.S.C. §102(b) and/or §103(a)

In the Office Action dated February 26, 2007, the Examiner had rejected claims 1, 3 - 6, 8, 12 -13, 15 - 17 and 27 - 32 under 35 U.S.C. §102(b) and/or §103(a) over the U.S. Patent No. 3,525,604 to Van Dornick. Applicants contend that all the claims are patentable over the Van Dornick reference.

The amendments presented herein are made in response to the Examiner's statements in the February 2007 Office Action. These amendments clearly place the application in condition for allowance. The independent claims 1, 12, 15, 27, 29 and 31 now recite embodiments where the upstream end and the downstream end are configured to allow blending of the glass-forming material. These claims have also been amended to recite that the exhaust is positioned to: i) allow exhaust gases to provide additional heat to the melting glass-forming material, and ii) allow at least some air-entrained glass-forming materials to settle back into the melting glass as exhaust gases travel from the upstream end to the downstream end. Support for these amendments is at least found in the specification at pages 8-9.

Consistent with the Supreme Court's ruling in the *KSR International Co. v. Teleflex, Inc.*, 550 U.S.__ , slip opinion (2007), the present invention provides a glass-melting furnace having numerous elements that work in an "unexpected and fruitful manner" (see *KSR*, supra, slip opinion at page 12). The various elements of the inventive glass-melting furnaces are arranged in a manner where the function of the elements is different from the Van Dornick reference relied upon by the Examiner in the

parent application.

The Van Dornick furnace has specific structural differences from the instant inventive glass furnace as claimed herein. The Van Dornick furnace requires an internal dam, or weir, structure 35 and an overflow dam structure 16. These two Van Dornick structures prevent blending of materials. In particular, the Van Dornick reference, from at least column 5, line 20 through column 6, line 66, is dedicated to explaining the importance of the weir 35 and the removal of slag from the furnace.

The Van Dornick reference also requires that the weir 35 and the dam 16 "separate out" the materials in the Van Dornick furnace in order to remove the slag layer that has been formed. The Van Dornick reference requires these two separating structures within its combustion chamber 11 so that the slag layer can be removed. Those skilled in the art would not consider the additional dam and weir structures, positioned at two different sections of the Van Dornick furnace (i.e., at the middle and at the end of the combustion chamber) as being useful in a glass melting and blending furnace.

Further, the Van Dornick reference is focused on separating the desired end product from the residues formed in the metal refining process. Those skilled in the art would not consider a *refining metal* furnace as suitable for producing a melted and blended product such as *glass*. Those skilled in the art having the "common sense" now required by the *KSR* case, supra, slip opinion at page 14, would not look to a "separation" furnace, as described in Van Dornick, in order to improve a "blending" glass-making furnace where all the ingredients are blended and melted together to form the molten glass.

It is to be noted that the Van Dornick furnace can not solve the problem found in prior art glass-melting furnaces where the velocity of the gases causes an undesired entrainment of the combustion fumes (released from the decomposition of the glass-forming raw materials) with the gases. The present invention provides a novel solution for glass-melting furnaces by having gases exhausted only from the exhaust at the downstream end of the glass-melting furnace. The Van Dornick reference was not

aware of these problems facing the glass-melting industry and did not address, let alone purport to solve, the problems found in glass making furnaces.

A person having ordinary skill in the art would have no apparent reason to reconfigure the Van Dornick elements, as proposed by the Examiner, in order to achieve the novel glass-melting furnace being claimed herein. (See *KSR*, supra, at slip opinion at page 14).

Further, as the Supreme Court held in the *KSR* case, supra, at slip opinion page 17, citing with approval, *Graham v. John Deere of Kansas City*, 383 U.S. 1 (1966), the

> "... factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning."

It is submitted that it is only with impermissible hindsight that the Examiner had decided that the Van Dornick furnace could be radially modified and then put to a totally different use. There is nothing in the Van Dornick reference that would give the artisan any reason to reconfigure the Van Dornick *metal refining* furnace by removing the weirs and dams in order to provide a furnace useful to make a very different type of material (i.e., *glass*). Those with the common sense and skill in the art of glass furnaces would have no "apparent reason" to look at the Van Dornick *metal refining* furnace as a way to homogenously blend and then melt together glass-forming materials.

Since the Van Dornick furnace requires structures to separate out material, it is submitted that the Van Dornick reference teaches away from a glass-melting furnace where no residue is formed. Rather, the present inventive glass-melting furnace requires very different structures positioned in very different arrangements from those required by the Van Dornick furnace in order to overcome the glass industry problem of gas velocity within the glass-melting furnace.

Therefore, the present invention provides the novel combination of: i) a glass-melting furnace having a melting end and a fining end through which molten glass is blended and discharged; ii) an exhaust in communication with a downstream fining end of the furnace; and, iii) the exhaust being positioned so that combustion gases are *only*

exhausted from such exhaust. Accordingly, Applicants submit that the claims are patentable under 35 U.S.C. §102 and §103.

III. Claims 2, 7 10 - 11 and 18 are also patentable under 35 U.S.C. §103(a)

In the Office Action dated February 26, 2007, the Examiner had rejected claims 2, 7 10 - 11 and 18 under 35 U.S.C. §103(a) over the Van Dornick reference in view of the U.S. Patent No. 5,925,165 to Pflügl (hereinafter "Pflügl").

Claims 2, 7 and 10 - 11 depend from independent claim 1, and claim 18 depends from independent claim 15. Thus, these dependent claims are allowable over Van Dornick for at least the reasons set forth above.

At least another reason these claims are further patentably distinct over the Van Dornick and the Pflügl references is that the Pflügl reference describes an *incinerator* for refuse where slag is melted and heavy metals are separated using three different chambers within the melt furnace. In the Pflügl reference, gases are exhausted out of all three chambers. (See, for example, in Fig. 1 in the Pflügl reference, arrow 15, arrow 26 and arrow 39). The Pflügl reference thus fails to address the need to prevent the "exhaust from being removed only at the downstream end of the furnace", which problem is solved by the present invention.

There is no reason to reconfigure the Van Dornick *metal refining* furnace with elements from the Pflügl *refuse incinerator* furnace in order to make the inventive *glass-melting* furnace. The present inventive glass melting furnace includes at least one exhaust that is positioned downstream in order to allow an increased residence time of exhaust gases in the furnace. The positioning of the exhaust also provides a more efficient use of what had been "waste" heat in prior art glass-melting furnaces. Thus, in the present inventive glass-melting furnace, the exhaust is positioned to i) allow exhaust gases to provide additional heat to the melting glass-forming material, and ii) allow at least some air-entrained glass-forming materials to settle back into the melting glass as exhaust gases travel from the upstream end to the downstream end.

Further, claims 7, 10 - 11 and 18 recite embodiments having at least two exhaust

stacks which are positioned or located at the downstream end of the furnace. The Van Dornick reference fails to disclose at least two exhaust stacks. The Pflügl reference also fails to teach or disclose at least two exhaust stacks which are positioned at the downstream end of the furnace. Instead, the Pflügl reference discloses two exhaust stacks positioned at the upstream end of a furnace.

There can be no interrelationship between the teachings of the Van Dornick reference with the teachings of the Pflügl reference since Van Dornick requires a stack at the downstream end while Pflügl requires that the stacks be positioned at the upstream end instead of the downstream end. In the absence of such teaching, the Examiner had failed to establish a prima facie case of obviousness. (See *KSR*, supra, at slip opinion at page 14). Accordingly, claims 7, 10 - 11 and 18 should be allowable over the Van Dornick and Pflügl references in their own right.

Nor is there any "apparent reason" (see *KSR*, supra, at slip opinion at page 14), to combine the disparate features found in the Van Dornick and Pflügl references. Neither of these dissimilar kinds of furnaces (i.e., the Van Dornick *metal refining* furnace or the Pflügl *refuse incinerator)* can be configured to allow for the homogenizing and melting of glass materials into molten glass. Rather, as fully set forth above, the Van Dornick *metal refining* furnace heats materials to refine metal materials and separate out slag by-products. The Pflügl *refuse incinerator* furnace heats and incinerates solid refuse to separate out different types of materials. No one skilled in the art having the requisite *KSR* creative "common sense" (see *KSR*, supra, at slip opinion at page 14), would look to the teachings in either the Van Dornick or Pflügl references to choose only certain disparate features from both a *metal refining* furnace and a *refuse incinerator* furnace and then combine such disparate features in order to provide a glass-melting furnace where a homogenously blended product is formed (i.e., by melting materials into molten glass).

Finally, the Examiner's argument that "such a combination would provide for a more even heating of the melted material in the furnace of Van Dornick" also fails when held to the standards set forth by the Supreme Court in the *KSR* case, supra.

There is no "apparent reason" to reconfigure of any pre-art glass-melting furnace (see *KSR*, supra, at slip opinion at page 21) with the *metal refining* Van Dornick elements or the refuse *incinerator* Pflügl elements. Rather, neither the Van Dornick reference nor the Pflügl reference is concerned about even heating since each furnace is used to separate out materials, rather than combine and form a melted, blended end product such as glass.

Accordingly, claims 7, 10-11 and 18 should be allowable over the Van Dornick and Pflügl references in their own right.

IV. Claims 9 and 14 are also patentable under 35 U.S.C. §103(a)

In the Office Action dated February 26, 2007, the Examiner had rejected claims 9 and 14 under 35 U.S.C. §103(a) over Van Dornick in view of the U.S. Patent No. 6,519,973 to Hoke (hereinafter "Hoke").

Claims 9 and 14 depend from claims 1 and 15, respectively, and should be allowable over Van Dornick for at least the reasons set forth above.

At least another reason these claims are further patentably distinct over the Van Dornick and the Hoke references is that the Hoke reference fails to cure the deficiencies in the Van Dornick reference. The Examiner had admitted that Van Dornick does not disclose an exhaust that is located at a sidewall of the furnace. For this teaching, the Examiner relied on Hoke, asserting that Hoke discloses a glass melting furnace where exhausts are located at sidewalls of the furnace. However, claim 14 recites two exhausts, wherein each exhaust is separated laterally from the sidewalls.

There is also no interrelated teaching between the Van Dornick and Hoke references, nor is there any "apparent reason" (see *KSR*, supra, at slip opinion at page 14), to combine the elements of Hoke and Van Dornick. The common-sense creative person skilled in the art, as now required by the *KSR* case, would not look to Hoke to use two exhausts, each separated laterally from the sidewalls, as set forth in claim 14.

In the absence of such teaching or suggestion, claim 14 should be allowable over the Van Dornick and Hoke references in its own right.

V. Claims 34 - 37 are also patentable under 35 U.S.C. §103(a)

In the Office Action dated February 26, 2007, the Examiner had rejected claims 34 - 37 under 35 U.S.C. §103(a) over Van Dornick in view of the U.S. Pub. No. 2001/0039813 to Simpson (hereinafter "Simpson") or U.S. Patent No. 6,237,369, to LeBlanc (hereinafter "LeBlanc").

Claims 34 - 37 depend from claim 1 and should be allowable over Van Dornick for at least the reasons set forth above. In particular, the claims 34 - 37 provide additional structurally unique features to the claimed invention. Claim 34 recites a fining zone within the glass-melting furnace and at least one downstream burner supplying heat to the fining zone. Claim 35 recites that the downstream burner is mounted in the roof. Claim 36 recites that at least one upstream burner is mounted at an angle of up to about 20 degrees to the vertical. Claim 37 recites that the downstream burner is mounted at an angle of up to about 20 degrees to the vertical.

At least another reason these claims are further patentably distinct is that the Simpson and LeBlanc references fail to cure the deficiencies in the Van Dornick reference. The Examiner had admitted that Van Dornick does not disclose a burner for supplying heat to the downstream fining end. For this teaching, the Examiner had relied on Simpson and/or Leblanc, asserting that Simpson and/or Leblanc disclose a glass melting furnace where a burner is installed in the roof.

There can be no interrelated teaching between the Van Dornick, Simpson and LeBlanc references, nor is there any "apparent reason" (see *KSR*, supra, at slip opinion at page 14), to combine the Van Dornick *metal refining* elements with the Simpson and/or Leblanc furnaces. The common-sense creative person skilled in the art, as now required by the *KSR* case, would not look to use either the Simpson or LeBlanc reference to provide upstream and downstream burners in combination with an exhaust positioned at the downstream end of at least one burner. Neither the Simpson nor the LeBlanc reference teaches or suggests a furnace where the exhaust is in communication with the downstream end of the furnace so that combustion gases in the glass-melting

furnace are exhausted only from the exhaust at the downstream end of the glass-melting furnace.

In the absence of such teaching or suggestion, claims 34 - 37 should be allowable over the Van Dornick, Simpson and LeBlanc references in their own right.

VI. Conclusion

In view of the above amendments to the claims and the remarks herein, it is submitted that the pending claims describe patentably distinct subject matter and that the application is in condition for allowance.

The invention, as defined in the pending claims, is neither disclosed nor suggested by the references of record. Accordingly, Applicants respectfully request allowance of all pending claims.

VII. Request for Telephone Interview

As a final matter, if the Examiner has any suggestions concerning different claim phraseology that, in the opinion of the Examiner, more accurately defines the present invention, prior to issuance of another Office Action, Applicants' attorney or agent requests the courtesy of a telephone interview at the Examiner's earliest convenience to discuss the application. Applicants' attorney or agent may be contacted at (740) 321-5359.